Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the	)	
Commission's Rules to	)	GEN Docket No. 90-314
Establish New Personal	)	ET Docket No. 92-100
Communications Services	)	

To: The Commission

REPLY COMMENTS OF THE UTILITIES TELECOMMUNICATIONS COUNCIL

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January 8, 1993

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SUMMARY

UTC continues to maintain that the FCC must not allow the development of PCS at the expense of existing users of the 2 GHz band and the public which they serve. UTC reiterates its belief that a fundamental element in this proceeding is the adoption of technical interference standards between PCS service providers and incumbent 2 GHz microwave users. Thus, at a minimum, utilities and other existing 2 GHz private microwave users must be assured interference protection equal to or better than the current level of protection.

Commenters echo UTC's position that the Commission's proposed interference calculations are in no way overly conservative. There is further agreement that since the operating parameters of PCS systems, as well as system architectures, are still undefined, the protection criteria for fixed microwave systems should be set, at least initially, to eliminate any doubt that microwave systems will be adequately protected.

There is nearly universal agreement among the commenters that it will not be possible to share the 1910-1930 MHz portion of the 2 GHz band between unlicensed PCS and existing 2 GHz microwave licensees. Accordingly, the Commission must not authorize PCS to operate in the 1910-1930 MHz band on an

unlicensed basis until after a mechanism is developed whereby: (1) all microwave users are relocated from the band; and (2) the expense of such relocation is borne in full by the manufacturers/vendors of unlicensed PCS equipment.

UTC firmly believes that the development of "commercial" PCS to meet the communications needs of the general public is a worthy goal. Moreover, UTC perceives a strong need for a separate PCS spectrum allocation to meet the internal communications needs of utilities and other core industries.

Accordingly, UTC reiterates its request for a non-commercial PCS allocation. A non-commercial allocation will ensure there is sufficient, guaranteed spectrum for the development of innovative and specialized PCS applications by private spectrum users. Once refined, the more innovative and complex PCS applications developed by non-commercial users would be adaptable for more general, large-scale distribution to the public.

Due to the many benefits inherent in a non-commercial allocation, UTC requests a non-commercial allocation of 40 MHz, for what would essentially amount to a non-commercial reserve. After a set amount of time, and depending upon how PCS develops, the FCC could consider whether to permit licensed commercial PCS operators to apply for unused portions of the non-commercial reserve, either for new systems, or to expand existing systems.

UTC proposes that the FCC evenly divide the remaining 80 MHz of commercial spectrum into two 40 MHz allocations, and that the Commission limit the number of commercial PCS service providers permitted in this initial licensing process to two per geographic area.

Although UTC opposed nationwide licensing in its comments as a disruption of the competitive PCS balance and a threat to the rapid implementation of service, UTC clarifies that it is not opposed to adoption of a proposal for licensing of national consortia composed of a major participant and a group of independent local operators with substantial ownership interests and management responsibilities.

Finally, UTC supports a regulatory licensing status for PCS under which the individual licensees could determine whether to offer service on a private or common carrier basis, provided that any PCS spectrum reserved for non-commercial use is regulated on a purely private or private carrier basis.

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Pursuant to Section 1.415 of the Federal Communications Commission's (FCC) Rules, the Utilities Telecommunications Council (UTC) hereby submits its reply comments with respect to the Notice of Proposed Rule Making and Tentative Decision (NPRM), 7 FCC Rcd 5676 (1992), in the above-captioned proceeding.[1/] The NPRM seeks comment on various issues related to deployment of personal communications services (PCS).

I. INTRODUCTION

UTC, as the national representative on communications matters for the nation's electric, gas, water and steam utilities, submitted extensive comments in this proceeding. UTC's comments focused on the critical nature of utility owned microwave facilities operating in the 1850-1990 MHz

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[1/] By Order, DA 92-1600, released November 24, 1992, the reply comment deadline was extended to January 8, 1993.

band. Accordingly, UTC stressed the importance of stringent PCS/microwave interference protection standards. At the same time, UTC's comments emphasized the importance of new communications technologies, such as PCS, in meeting the private, internal communications needs of the utility industry. Below, UTC again addresses these issues, in the context of the comments filed by the various parties in this proceeding.

II. THE COMMENTS CONFIRM THAT FIXED MICROWAVE USERS MUST BE PROTECTED

A. Interference Standards Must Protect Fixed Microwave Users

UTC's comments emphasized that a fundamental component in this proceeding is the adoption of technical interference standards between PCS service providers and incumbent 2 GHz microwave users. UTC noted that the nation's utility industry places extensive reliance on private microwave systems operating in the 2 GHz band to meet critical communications needs, and that utilities cannot tolerate interference to their microwave systems without compromising safety and reliability of service to the public. Accordingly, UTC urged that, at a minimum, utilities and other existing 2 GHz private microwave users must be assured interference protection equal to or better than the current level of protection.

Numerous commenters reiterate this argument to the FCC. For example, the American Petroleum Institute (API) states that the FCC bears an affirmative and undeniable obligation to ensure that emerging technologies (such as PCS) do not inflict harmful interference on critical point-to-point microwave services.[2/] Further, the Public Safety Microwave Committee (PSMC) stresses that state and local government microwave facilities must be fully protected against any harmful interference from new PCS users of the band.[3/]

B. The Proposed Interference Standards Are Not Overly Conservative

Currently, the interference protection standard for 2 GHz fixed microwave operations contained in Section 94.63 of the Commission's rules is the Telecommunications Industry Association's (TIA) Bulletin 10E. However, as the Commission correctly notes, the TIA Bulletin 10E standard was designed to protect against interference between and among private fixed microwave systems and therefore is not currently designed to protect against interference to fixed microwave stations from PCS base and mobile operations. Accordingly, the FCC is proposing to modify the application of TIA 10E standard to take into account PCS operations.

[2/] API, p. 12.

[3/] PSMC, p. 2.

Specifically, the Commission is proposing that each PCS licensee determine potential interference by calculating the signal level from each proposed co-channel and adjacent channel PCS base station and associated mobiles at the inputs of all fixed microwave receivers within a specified coordination zone. To make this determination, PCS licensees would be required to calculate the total PCS power level at the subject microwave receiver from each base station and its associated mobile and portable stations. Under the Commission's proposal, if the total PCS power level at the microwave receiver exceeds the TIA 10E standard, the PCS licensee would have to make the necessary changes to bring its system into conformance with TIA 10E.[4/]

A few PCS proponents oppose the Commission's proposed methodology as being overly protective of fixed microwave operations.[5/] Upon examination, nearly all of the objections are based on the perceived difficulty that PCS systems will have in sharing spectrum on a co-primary basis with 2 GHz microwave licensees. For example, PCN America states that

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[4/] TIA is currently revising its microwave interference standard. The new standard, TIA 10F, is being formulated to take into account the existence of PCS operations much as the Commission has proposed in its NPRM.

[5/] Comcast PCS Communications, Inc., (Comcast) p. 40; Motorola, pp. 34-35; PCN America p. 8; Tel/Logic, p. 17; and Telocator, pp. 18-19.

TIA 10E is much too conservative for use in today's crowded spectrum environment.[6/]

According to some PCS proponents, the "solution" to effective PCS/microwave sharing is a "loosening" or "relaxing" of the interference standards. UTC considers such suggestions as self-serving to the PCS industry, and wholly unacceptable. The purpose of PCS/microwave interference standards is to protect existing microwave operations from harmful interference and, as such, a "loosening" of the protection standard would undermine its very purpose.

As UTC noted in its comments, often utilities are not using 2 GHz microwave systems for standard voice or data applications, but instead are using these systems for instantaneous control of utility systems such as high voltage transmission facilities. Thus, utilities cannot tolerate any interference and must be able to precisely gauge whether a given emerging technology system is going to interfere with a microwave system. The methodology proposed by the Commission and TIA would allow for such precision.

Moreover, since the operating parameters of PCS systems, as well as system architectures, are still undefined, the

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[6/] PCN America, p. 8.

protection criteria for fixed microwave systems should be set, at least initially, to eliminate any doubt that microwave systems will be adequately protected. Only after enough experience is gained through actual PCS deployment should any thought be given to relaxing the criteria.

A number of commenters agree with UTC that the interference calculations and methodology proposed by the Commission and TIA are a good starting point for protecting existing microwave operations from interference. These commenters echo UTC's position that the proposed calculations are in no way overly conservative. As the Association of American Railroads (AAR) notes, it would be dangerous to relax the existing interference protection standards in any way, given the critical operations supported and controlled by the affected 2 GHz fixed microwave systems.[7/] PSMC characterizes a reduction in the protection provided by 10E as creating the proverbial "disaster waiting to happen."[8/]

Further, the Commission has explicitly stated that the technical proposals in this proceeding are contingent upon the final outcome of its "spectrum reserve" proceeding, ET

[7/] AAR, p. 2.

[8/] PSMC, pp. 3-4.

Docket No. 92-9.[9/] Therefore the Commission's decision regarding interference standards between PCS and 2 GHz microwave users must be consistent with the "transition framework" that the FCC recently adopted in ET Docket No. 92-9. Part of the transition framework adopted by the Commission mandates that interference standards adopted in subsequent proceedings must protect existing 2 GHz microwave facilities. Thus, in considering technical interference standards between PCS and 2 GHz microwave users the Commission must approach this task from the standpoint of protecting existing microwave users from potential interference.

C. TIA Is The Appropriate Standards Setting Body

While there is some disagreement among PCS proponents and 2 GHz microwave users regarding the appropriate PCS/microwave standard, nearly all parties agree with UTC that TIA Committee TR14.11 is the most appropriate standard-setting body to develop such standards. As UTC noted, no other existing standards-setting body fairly represents the views and concerns of the private microwave community, or is as well-versed in the interference-protection needs of private microwave systems. Included among the commenters supporting the use of TIA to determine the appropriate

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[9/] NPRM, paras. 32 and 104.

interference standard is Telocator, which represents many, if not most, of the PCS proponents.[10/] Therefore, if the FCC elects to have an outside standard-setting body develop interference standards, UTC urges the Commission to specifically designate TIA.[11/]

1. All Calculations Should Attempt To Provide Microwave Users With Protection on a Worst-Case Basis

UTC joins PSMC in urging that all power level calculations assume a worst-case scenario, i.e., all PCS talk channels are full and the vast majority of PCS users are simultaneously attempting to make calls on the system.[12/] This methodology would therefore require line-of-site path loss calculations in determining interference levels rather than basing calculations on probabilities.

If, however, a statistical model is relied upon, UTC agrees with Harris in urging the adoption of a conservative

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[10/] Telocator, p. 19.

[11/] As UTC noted in its comments, the FCC has, on previous occasions, recognized a single standard-setting body. See, e.g., 47 C.F.R. §1.1307(b), recognizing and adopting ANSI radiation exposure guidelines; and Filing and Review of Open Network Architecture Plans, 4 FCC Rcd 1 (1988), recognizing the Information Industry Liaison Committee (IILC) of the National Exchange Carriers Standards Association as the appropriate body to develop certain ONA standards.

[12/] PSMC, p. 4.

model.[13/] For example, UTC opposes PCN America's suggestion that the FCC use the Hata model to predict interference to fixed microwave stations.[14/] The Hata model was developed primarily to determine mobile service coverage areas, and as such, is not an appropriate basis for predicting microwave interference. Further, a statistical model such as Hata is based on averages, which necessarily means there will be actual path losses that are less than the predicted losses. UTC suggests that any model be supported by empirical test data from diverse sources and various regions of the country.

Moreover, as indicated in UTC's comments, if the Commission elects to establish the use of "weighting" factors in calculating the interference potential of portables, the Commission must adopt different weighting standards depending on the proposed or likely use of individual PCS systems. For example, the FCC should develop one weighting standard for PCS systems that will be used exclusively inside buildings, and another weighting factor for all other PCS systems. Outside and mixed use PCS systems should arrive at weighting factors based on worst case calculations that assume all mobiles and portables on the system are operating outside with no attenuation factor.

[13/] Harris, p. 4.

[14/] PCN America, p. 10.

2. FCC Must Include Spectrum Sharing Techniques In PCS Interference Calculations

UTC's comments expressed concern that the Commission has failed to factor innovative spectrum sharing techniques (e.g., variable power control, frequency agile sharing technologies, etc.) into PCS interference calculations. UTC asserted that it would be meaningless for industry and/or the Commission to develop coordination and interference criteria for PCS/microwave sharing if PCS applicants are permitted to simply indicate they will use a "dynamic frequency allocation system" or "variable power controls," the efficacy of which are unproven in the context of fully deployed PCS.

PSMC reiterates UTC's concern, arguing that as a new, unproven technology, PCS systems may operate in the real world quite differently than in small experimental applications. Accordingly, PSMC suggests that PCS systems employing novel spectrum sharing technologies, such as a technology that automatically "assigns" frequencies to PCS units to avoid interference, must be required to comply with the proposed interference guidelines for each frequency used.[15/]

PSMC's recommended approach is in substantial accord with UTC's comments, wherein UTC suggested a plan under which

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[15/] PSMC, p. 5.

PCS licensees employing novel spectrum sharing techniques would be required to calculate the interference potential to microwave systems without regard to any special spectrum-sharing techniques; i.e., at peak transmitting powers, on all channels, from the maximum number of mobiles for which the system is designed. If these calculations show interference levels that exceed the adopted interference standard then the PCS licensee would have to either adjust its system (such as by reducing peak operating powers or numbers of mobiles), which adjustments would become a license condition, or the licensee could apply for a waiver to incorporate dynamic interference reduction techniques. The waiver would require the PCS provider to make a special showing demonstrating the absence of interference potential through field testing. All potentially-affected microwave licensees would also be invited to comment on the special showing and the waiver request.[16/]

3. The FCC Must Limit The Number of Transmitting Mobiles To Avoid Interference To Fixed Users

UTC concurs with PSMC that an important consideration is the potential for interference to 2 GHz microwave systems caused by excessive numbers of PCS handsets and mobiles

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[16/] As experience is gained in the use of dynamic spectrum sharing techniques, the showings required in making these waiver requests would probably become streamlined and impose no undue burden on PCS applicants.

simultaneously attempting to make calls on the PCS system during major emergencies such as storms, civil disturbances and other catastrophic events. As PSMC notes, these are the same periods when public safety microwave systems are at maximum capacity and least tolerant of interference.[17/]

In order to avoid this situation, UTC reiterates its recommendation that the Commission adopt a requirement that a PCS mobile or portable station not be capable of transmitting unless it receives prior authorization from an associated base station. In turn, each base station should be limited, by its license, to authorizing no more mobile units than were proposed in the system application and upon which the licensee's interference calculations were made.

4. The FCC Must Impose Emission Limits on Band Edges

In order to further minimize potential interference to 2 GHz microwave from PCS, the FCC should specify an emission limit for each PCS licensee's authorized band edge. These emission limits should be based on T/I curves for both digital and analog cases.

[17/] PSMC, p. 4.

5. PCS Allocations in Paired Multiples of 10 MHz Would Reduce Potential Interference and Ease Negotiations

While UTC's specific recommendations for PCS spectrum allocations are discussed more fully below, it should be noted that channel pairing based on multiples of 10 MHz would be more consistent with current 2 GHz microwave licensing than the Commission's proposed 15 MHz channel pairs. If the Commission allocates two paired 40 MHz blocks (20 MHz per channel) to commercial PCS, licensees would have additional spectrum to work around existing microwave users and thus reduce potential interference.

Further, as Omnipoint Communications (Omnipoint) correctly points out, the proposed paired 30 MHz PCS allocations would complicate negotiations since a single 10 MHz microwave path could be overlapped by two different PCS licensees with 15 MHz channels, thus, creating the potential for three-way negotiations.[18/] An allocation of spectrum based on paired multiples of 10 MHz would alleviate this situation by eliminating the possibility of two PCS licensees overlapping a single 2 GHz microwave path.

[18/] Omnipoint, pp. 9-10.

D. Power and Antenna Height Limits Are Needed

A large number of the commenters agree with UTC and the Commission that limits on PCS power and antenna heights are definitely needed, and are in general agreement with the FCC's proposed limits of 10 watts EIRP for base stations and 2 watts EIRP for mobiles.

UTC, however, continues to oppose the Commission's proposed 300 foot maximum antenna height as excessive. As UTC noted, the distance to the horizon for a 300 foot antenna is about 25 miles (assuming 4/3 earth), thus establishing a standard for cell size of approximately 2,000 square miles. Such a large cell size would be inconsistent with a microcell architecture. UTC therefore reiterates its suggestion that antenna height be limited to 200 feet above average terrain. At these heights, PCS base stations would be at about the same height as typical microwave stations. Those PCS systems needing higher antennas should be required to file for a waiver and justify the need.[19/]

UTC joins AAR, API, Bell South Enterprises, Centel, GTE, PCN America, and Pacific Telesis Group, in opposing the Commission's suggestion that PCS systems be allowed a

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[19/] The Commission should formulate a power/height reduction table in order to calculate the appropriate power level for PCS systems with antennas heights more than 200 feet above average terrain.

significantly greater power and antenna height (e.g., 1,000 watts/1969 feet AAT). As Bell South notes, high power levels should be prohibited since there is a greater likelihood that PCS will cause interference to fixed microwave stations.[20/]

Further, as API notes, PCS proponents since early-on have claimed the ability to successfully operate PCS systems with significantly lower power/height limits than suggested by the Commission.[21/] Thus, it would be inconsistent and inefficient to justify an allocation of spectrum for "high power PCS" based on "low power PCS" experiments. Moreover, as GTE points out, if cellular-type power levels are used for PCS, transmit powers for mobiles would require larger batteries and thereby impede portability.[22/]

If, however, the Commission does allow significantly higher power and antenna height levels the interference calculations of 10E would necessarily require larger coordination distances (see below) in order to reflect the increased area of potential interference.

[20/] Bell South, p. 14.

[21/] API, p. 12.

[22/] GTE, p. 21.

E. Microwave Licensees Need Actual Notice of PCS Applications

UTC concurs with PSMC in supporting the FCC's proposal that PCS licensees demonstrate protection to all co-channel and adjacent channel microwave receivers within 125 miles of any PCS base station,[23/] provided that the PCS power is limited to 10 watts EIRP and the antenna height is limited to 200 feet above average terrain. However, there may be a need for longer coordination distances for PCS systems located in mountainous areas. If PCS power and antenna height limits are not limited to 10 watts/200 feet, the coordination distances listed in Table 1 of the NPRM are acceptable.

In order to adequately alert 2 GHz microwave users to potential interference, the FCC has proposed a requirement that PCS licensees be required to serve all potentially-affected microwave licensees with a prior coordination notice before filing base station applications with the FCC. American Personal Communications (APC) opposes the prior coordination notice requirement based on its concern that the requirement would provide opportunities for microwave operators to file frivolous objections to coordination notices.[24/]

[23/] PSMC, p. 6.

[24/] APC, p. p. 57.

UTC supports the prior coordination notice requirement, and views APC's objections as unwarranted. Moreover, any concerns regarding potential abuse are far outweighed by the significant public interest benefits of prior coordination notification. Further, the FCC currently has means available to deal with the filing of frivolous, or "strike," petitions. Given the largely unproven nature of PCS/microwave spectrum-sharing, and the critical nature of microwave systems operating in this band, potentially-affected microwave licensees must be given actual notice of potential PCS interference. The procedures of Section 21.100 of the Commission's Rules provide an acceptable model.

F. Spectrum-Sharing Between Unlicensed PCS Users And Fixed Microwave Licensees Is Unworkable

1. Proposed Power Limits for 2 GHz Unlicensed Devices Provide Inadequate Protection

There is nearly universal agreement among the commenters that it will not be possible to share the 1910-1930 MHz portion of the 2 GHz band between unlicensed PCS and existing 2 GHz microwave licensees. As Northern Telecom succinctly states, spectrum cleared of point-to-point microwave licensees is necessary for the effective use of unlicensed product.[25/]

[25/] Northern Telecom, p. 18.

In an effort to facilitate sharing of the band, the Commission has proposed low power limits for unlicensed PCS systems. However, UTC joins Alcatel in disagreeing with the Commission's assumption that its proposed PCS power levels are sufficiently low so that microwave operations would not be adversely impacted. Alcatel demonstrates that a 1 watt PCS system could cause unacceptable interference to a microwave system.[26/]

Given the inadequacy of the FCC's proposal to protect existing microwave operations from unlicensed PCS devices, and the vital nature of microwave systems in the 1910-1930 MHz band, UTC urges the Commission not to authorize any unlicensed PCS system to operate in this band until: (1) an adequate interference protection scheme is identified and implemented; or (2) all existing microwave users are given an opportunity to relocate from the band. Omnipoint supports this position, arguing that until these issues are resolved it cannot endorse an allocation of these frequencies. Omnipoint recommends that the 1910-1930 MHz band be set-aside for unlicensed PCS, but not allocated until a final mechanism and funding is in place to achieve national relocations of incumbent microwave users.[27/]

[26/] Attachment to Alcatel comments: "Specific Comments Regarding Unlicensed PCS Operations."

[27/] Omnipoint, p. 15.

2. The FCC Must Mandate A Consortium of PCS Manufacturers/Vendors To Pay Relocation Costs

As UTC noted in its comments, a fundamental concern of 2 GHz microwave users with regard to the FCC's proposal to allow unlicensed PCS within the 2 GHz band is the inability of existing microwave users to seek reimbursement for relocation from this part of the band. As stated in its comments, UTC believes that the only method by which existing users can be assured of reimbursement of relocation expenses is if all manufacturers/vendors of unlicensed PCS equipment were required to join a consortium that guaranteed the costs of 2 GHz relocation prior to grant of FCC equipment certification.

A number of commenters express support for the concept of a consortium-type mechanism to fund the relocation of existing microwave licensees operating in the 1910-1930 MHz band. For example, Telocator, Wireless Information Network Forum (WINForum), and Motorola all provide detailed proposals for the administration of such a consortium of manufacturers/vendors.[28/]

As the 1910-1930 MHz band is relatively lightly loaded, it should be feasible for such a consortium to determine the

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[28/] Motorola, pp. 42-43; Telocator, pp. 22-24; and WINForum, pp. 8-11.